What is claimed is:

1.   A temperature estimation apparatus, comprising:

state detection means for detecting a value of a state variable which correlates with a temperature of a part to have its temperature detected;

memory means for prestoring therein correspondence information which indicate corresponding relations between detected results of said state detection means and temperatures of the part for the temperature detection; and

estimation means for estimating the temperature of said part for said temperature detection by referring to the correspondence information on the basis of the detected result of said state detection means.

2.   A temperature estimation apparatus as defined in claim 1, wherein:

said part for said temperature detection is a catalyst which cleans exhaust gas of an engine; and

said state variable includes at least one member which is selected from the group consisting of a quantity of intake air, a quantity of fuel injection and r. p. m. (revolutions per minute) of the engine.

3.   A method of estimating a temperature of a catalyst, comprising the steps of:

3   prestoring corresponding relations between

4   temperatures of the catalyst which cleans exhaust gas of an

5   engine and values of a state variable which correlates with

6   the temperatures of said catalyst; and

7   detecting an actual value of the state variable,

8   and then comparing the detected value with the stored

9   corresponding relations, thereby estimating the temperature

10   of said catalyst.

11   4.   A catalyst-deterioration diagnostic system for

12   diagnosing a deterioration state of a catalyst, comprising:

13   index means for obtaining a value of an index

14   which is used for deciding the deterioration state of the

15   catalyst;

16   catalyst state estimation means for estimating a

7   state of said catalyst at a time at which said index means

8   has obtained the index value, as to a physical quantity

9   which affects a catalytic action of said catalyst;

10   correction means for correcting said index value

11   obtained by said index means, to a value in a standard

12   state of said catalyst previously set as to the physical

13   quantity, by the use of the estimated result of said

14   catalyst state estimation means; and

15   decision means endowed with a preset criterion

16   value, and for deciding said deterioration state of said

17 catalyst by comparing the index value corrected by said

18 correction means, with the criterion value.

1 5. A catalyst-deterioration diagnostic system for

2 diagnosing a deterioration state of a catalyst, comprising:

3 index means for obtaining a value of an index

4 which is used for deciding the deterioration state of the

5 catalyst;

6 decision means endowed with a preset criterion

7 value, and for deciding said deterioration state of said

8 catalyst by comparing the index value obtained by said

9 index means, with the criterion value;

10 catalyst state estimation means for estimating a

11 state of said catalyst at a time at which said index means

12 has obtained said index value, as to a physical quantity

13 which affects a catalytic action of said catalyst; and

14 suspension means endowed with a predetermined

15 range concerning the physical quantity, and for causing

16 said decision means to suspend the decision on condition

17 that a value of said physical quantity obtained by said

18 catalyst state estimation means is outside the

19 predetermined range.

1 6. A catalyst-deterioration diagnostic system for

2 diagnosing a deterioration state of a catalyst as defined

3 in claim 4, wherein:

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4   said catalyst serves to eliminate noxious

5 substances which are contained in exhaust gas of an

6 engine; and

7   said catalyst state estimation means includes;

8   operating-situation detection means for

9 detecting a value of that state variable of the engine

10 which correlates with said physical quantity;

11   memory means for storing therein

12 correspondence information which indicate correlations

13 between values of the state variable and those of said

14 physical quantity; and

15   arithmetic means for determining a value of

16 said physical quantity by referring to the correspondence

17 information on the basis of the detected result of said

18 operating-situation detection means.

1   7.. A catalyst-deterioration diagnostic system for

2 diagnosing a deterioration state of a catalyst as defined

3 in claim 5, wherein:

4   said catalyst serves to eliminate noxious

5 substances which are contained in exhaust gas of an

6 engine; and

7   said catalyst state estimation means includes;

8   operating-situation detection means for

9 detecting a value of that state variable of the engine

10 which correlates with said physical quantity;

11   memory means for storing therein

12   correspondence information which indicate correlations

13   between values of the state variable and those of said

14   physical quantity; and

15   arithmetic means for determining a value of

16   said physical quantity by referring to the correspondence

17   information on the basis of the detected result of said

18   operating-situation detection means.

1   8.   A catalyst-deterioration diagnostic system for

2   diagnosing a deterioration state of a catalyst, wherein the

3   catalyst serves to eliminate noxious components which are

4   contained in exhaust gas of an engine; comprising:

5   index means for obtaining a value of an index

6   which is used for deciding the deterioration state of said

7   catalyst;

8   operating-situation detection means for detecting

9   a value of that state variable of the engine which

10   correlates with a physical quantity affecting a catalytic

11   action of said catalyst;

12   correction means for correcting the index value

13   obtained by said index means, to a value in a standard

14   state of said catalyst previously set as to the physical

15   quantity, by the use of the detected result of said

16   operating-situation detection means; and

17   decision means endowed with a preset criterion

18   value, and for deciding said deterioration state of said

19   catalyst by comparing the index value corrected by said

20   correction means, with the criterion value.

1   9.   A catalyst-deterioration diagnostic system for

2   diagnosing a deterioration state of a catalyst, wherein the

3   catalyst serves to eliminate noxious components which are

4   contained in exhaust gas of an engine; comprising:

5   index means for obtaining a value of an index

6   which is used for deciding the deterioration state of said

7   catalyst;

8   decision means endowed with a preset criterion

9   value, and for deciding said deterioration state of said

10   catalyst by comparing the index value obtained by said

11   index means, with the criterion value;

12   operating-situation detection means for detecting

13   a value of that state variable of the engine which

14   correlates with a physical quantity affecting a catalytic

15   action of said catalyst; and

16   suspension means endowed with a predetermined

17   range concerning the state variable, and for causing said

18   decision means to suspend the decision on condition that

19   the value of said state variable detected by said

20   operating-situation detection means is outside the

21   predetermined range.

1   10. A catalyst-deterioration diagnostic system as

2   defined in claim 5, further comprising:

3   alarm means for giving an alarm for the suspension

4   of said decision when said decision has been suspended by

5   said suspension means.

1   11. A catalyst-deterioration diagnostic system as

2   defined in claim 9, further comprising:

3   alarm means for giving an alarm for the suspension

4   of said decision when said decision has been suspended by

5   said suspension means.

1   12. A catalyst-deterioration diagnostic system for

2   diagnosing a deterioration state of a catalyst, wherein the

3   catalyst serves to eliminate noxious components which are

4   contained in exhaust gas of an engine; comprising:

5   index means for obtaining a value of an index

6   which reflects the deterioration state of said catalyst;

7   operating-situation detection means for detecting

8   a value of that state variable of the engine which

9   correlates with a physical quantity affecting a catalytic

10   action of said catalyst;

11   correction means for correcting the value

12   detected by said operating-situation detection means, to a

13   value in a standard state of said catalyst previously set

14 as to the index, by the use of the index value obtained by

15 said index means; and

16   decision means endowed with a preset criterion

17 value, and for deciding said deterioration state of said

18 catalyst by comparing the value corrected by said

19 correction means, with the criterion value.

1   13. A catalyst-deterioration diagnostic system as

2 defined in claim 6, wherein:

3   the physical quantity is a temperature of said

4 catalyst; and

5   said state variable includes at least one member

6 which is selected from the group consisting of a quantity

7 of intake air, a quantity of fuel injection and r. p. m.

8 (revolutions per minute) of the engine.

1   14. A catalyst-deterioration diagnostic system as

2 defined in claim 8, wherein:

3   the physical quantity is a temperature of said

4 catalyst; and

5   said state variable includes at least one member

6 which is selected from the group consisting of a quantity

7 of intake air, a quantity of fuel injection and r. p. m.

8 (revolutions per minute) of the engine.

1   15. A catalyst-deterioration diagnostic system as

2 defined in claim 9, wherein:

3   the physical quantity is a temperature of said

4 catalyst; and

5   said state variable includes at least one member

6 which is selected from the group consisting of a quantity

7 of intake air, a quantity of fuel injection and r. p. m.

8 (revolutions per minute) of the engine.

1   16. A catalyst-deterioration diagnostic system as

2 defined in claim 12, wherein:

3   the physical quantity is a temperature of said

4 catalyst; and

5   said state variable includes at least one member

6 which is selected from the group consisting of a quantity

7 of intake air, a quantity of fuel injection and r. p. m.

8 (revolutions per minute) of the engine.